



Educating engineering designers for a multidisciplinary future

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Educating engineering designers for a multidisciplinary future

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Functional Product Development (FPD) and Product Service Systems (PSS)


■ Different names...

» Similar intentions!

- A product development view
- Support engineering designers and teams
 - Knowledge
 - Process
 - Methods
 - Tools

» Integrating a service perspective

- For the purpose to
 - Develop FPD/PSS offerings
 - Life cycle perspective/life cycle commitment
 - Need fulfillment drives the development process
 - Take additional aspects into early phases, e.g., environmental

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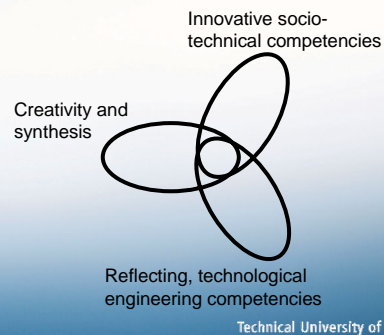
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What? Why? How?

- Education of engineering designers
- FPD/PSS trigger a new role
 - » Extended responsibilities
- An engineering design curriculum which integrates the domains of
 - » Socio-technological analysis
 - » Synthesis
 - » Technical skills



Requirements on future engineering designers

- Growing importance of
 - » Information technology in supporting the life cycle performance of products
 - » Worldwide collaboration
 - In enterprises and *between* enterprises/actors in
 - Development
 - Manufacturing
 - Delivery
 - Services & Support
- The engineering designer as a coordinator and integrator
 - » Guiding communication between different professions
 - » Extracting/analyzing and drawing conclusions on user needs and offering potentials
 - » Driving business development by synthesis of PSS offers

A deep dive, an example...

■ Lego exercise

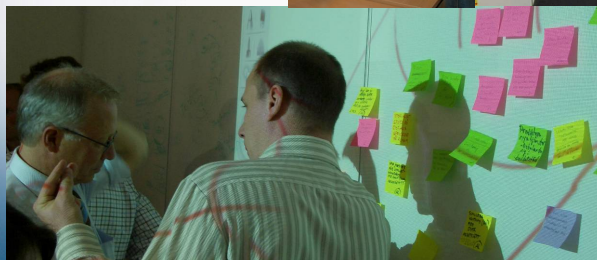
- » To experience what can be problematic
 - Lecturing is one thing, make things happen another
- » Go from needs to product very fast, approx 10 min exercise
 - Task – what is at hand?
 - Shared vision
 - Roles – who is going to do what?
 - Assign a team
 - Collaboration – do what with whom?
 - Team competences
 - Communication – from one point of view to another
 - Tacit knowledge
 - Complicated
- » = a bit more prepared for the project part
 - Have a sense of what will be

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Lecture course @ LTU

- 'Live as we learn'
- Education
- Industry



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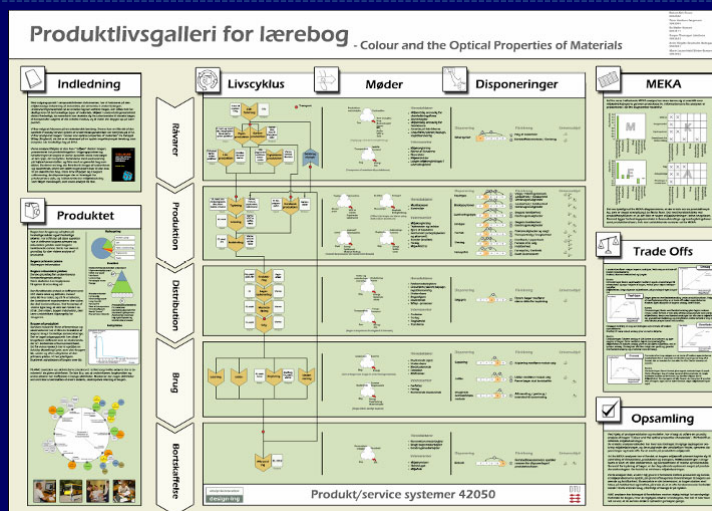


Case course @ DTU

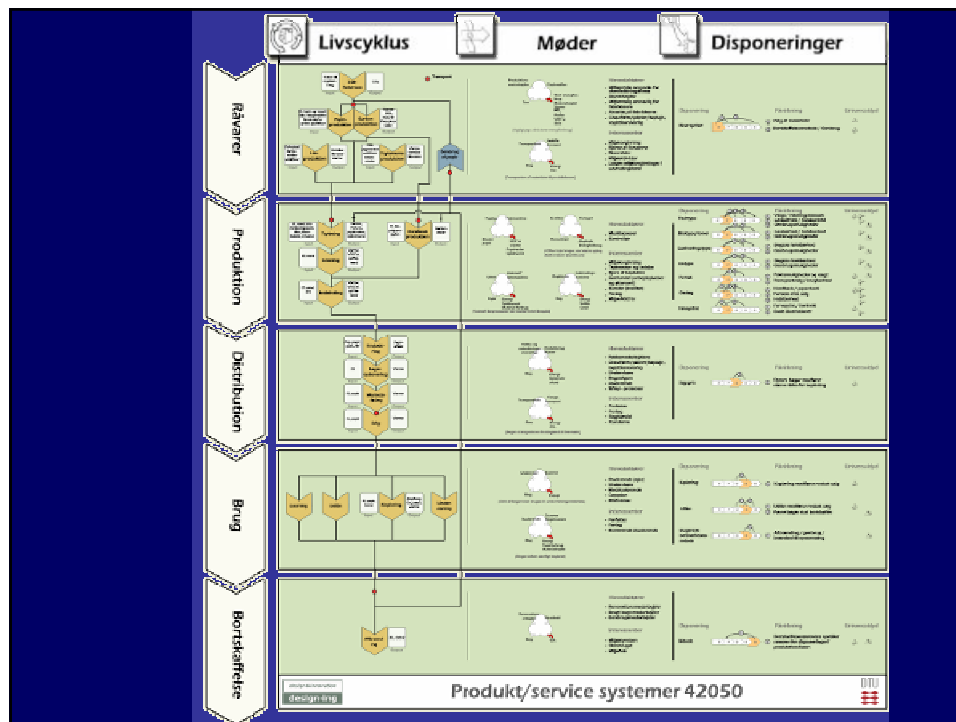
- The student teams are first guided through an analysis of the initial product's product life cycle, yielding insights into four aspects of product design:
 - » identification of current environmental impacts,
 - » life phase systems the product encounters,
 - » activities that involve the human actor (i.e. customer) and the product,
 - » actor-network that support and supply these activities throughout the product's life.
- Based on the analysis, goals are set for the improved solution and concepts are developed for a new product/service-system.
- This way the students are lead through
 - » engineering and
 - » socio-technical analysis tasks and thereby laying the foundation for their
 - » synthesis work
 in the concept development phase of the project



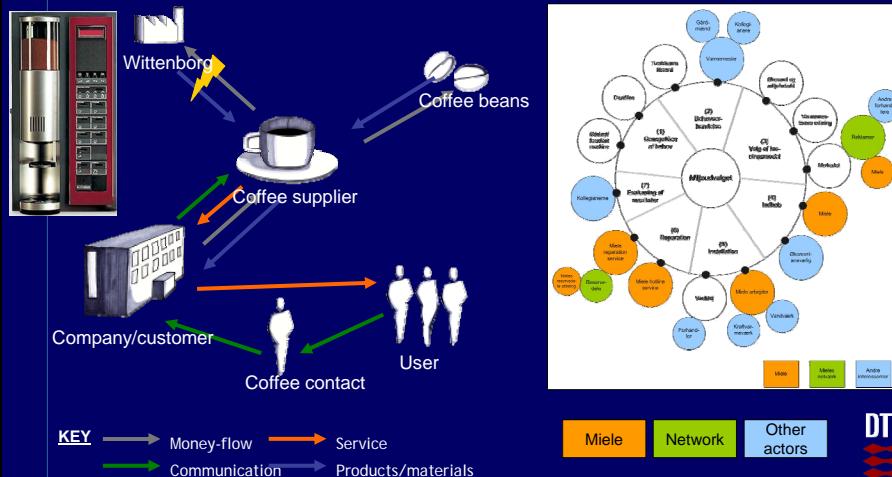
Product life gallery



[design.ing student project, 2006]

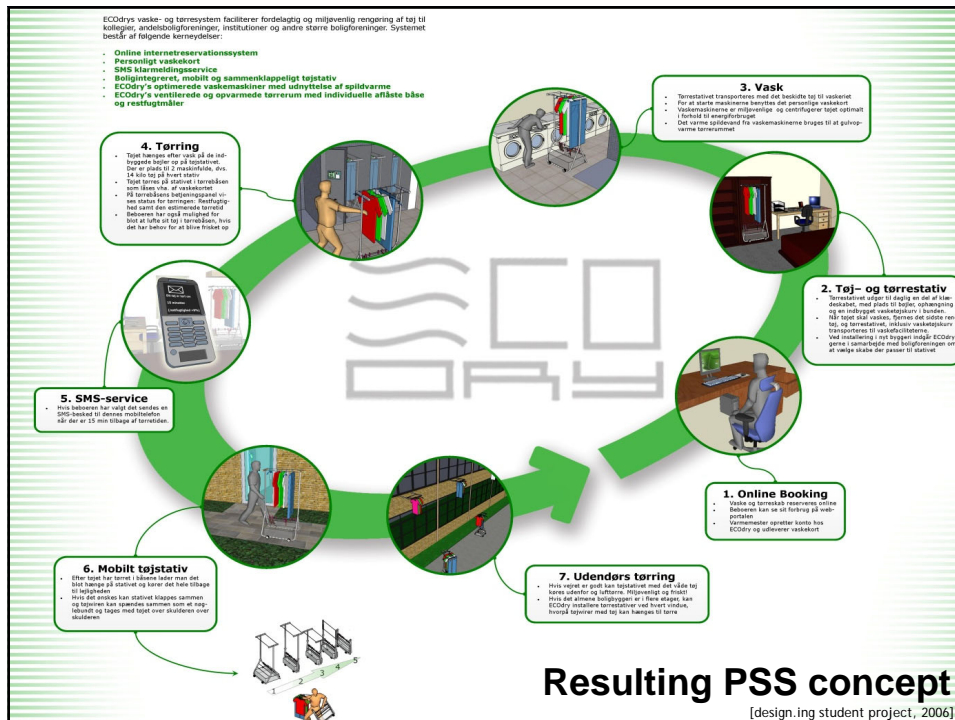


Actor-networks and Actors activity cycles



[design.ing student project, 2004]

[design.ing student project, 2006]



Our message...

- FPD/PSS an interest in industry today
 - » Importance of socio technical competences in future education of engineering designers
- Challenge traditional engineering design curriculum
 - » Not only problem-solving, also problem definition
 - » More tacit aspects into concept phase
 - » Extended responsibilities for engineering designers
- A new role in real product development projects